



American Institute of Aeronautics and Astronautics

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

July 20, 1993

Ms. Donna R. Searcy, Secretary
Federal Communications Commission
1919 M Street, NW. Room 222
Washington, D.C. 20554

Subject: AIAA Comments on Use of Ka Band
Reference: cc Docket No. 92-297/RM 7722

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Dear Ms. Searcy:

The American Institute of Aeronautics and Astronautics has reviewed this filing for license regarding the referenced Ka band application. Because it is of such serious concern on the future use of limited space communications frequencies and because our members have been researching use of this band for so long, we feel it was incumbent on us to share our views with you on this subject.

The paper was written by the AIAA Communications Technical Committee (CSTC) and a consensus was reached as to its contents. It was also approved by the appropriate staff members and AIAA member executives. A list of the CSTC members is also attached.

If you have any questions on our policy please call me at (202) 646-7530. Technical questions can be addressed to Mr. William T. Brandon whose particulars are on the attached list.

Thank you for considering our comments.

Sincerely,



Harry J. Sheetz, Division Director
Technical Services

cc: Dr. Malcolm R. Currie, AIAA President-Elect
Dr. Ronald E. York, AIAA Vice President, Public Policy
Dr. J. Michael Murphy, AIAA Vice President, Technical Activities
Mr. Cort Durocher, AIAA Executive Director
Mr. William T. Brandon, AIAA CSTC Chairman

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WHITE PAPER ON
CONCERNS ON THE 30/20 GHZ FREQUENCY ALLOCATION

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AIAA Technical Committee on Communications Systems

American Institute of Aeronautics and Astronautics
The Aerospace Center
370 L'Enfant Promenade, SW
Washington, D.C. 20024

12 July 1993

This report is the product of the Communications Systems
Technical Committee members and should not be
construed as an official position paper of the AIAA.

This paper addresses an important question relating to the future communications infrastructure of the United States. Simply stated, the question is whether the FCC should license the use of the Ka Band (30 GHz) for line-of-sight broadcast distribution of television and multiplexed data services termed Local Multipoint Distribution Services (LMDS). The Question arises due to a filing for such a license (CC Docket No. 92-297; RM 7722). This license and associated rule-making request raises fundamental issues concerning the future of telecommunication in the United States.

Movement of Communications Satellites to Ka band

Telecommunications in general is undergoing unparalleled, rapid evolution. Satellite communications, in particular, is at a turning point, about to evolve into fundamentally different services and market areas. Seen in historical perspective, these changes are evolutionary and inevitable, continuing a process that began with fixed, indirect services for aggregated users (large earth stations connecting multiple channel telephone trunks). It is evolving towards direct user services (small earth station with single channel connectivity serving an individual user or site). In many cases satellite communications by-passes telephone infrastructures in proceeding towards extensive mobile and personal application (still smaller earth stations, able to roam to any point on earth, associated with an individual person). Responsible spectrum management

Request for Rules Change to Allow Shared Use with LMDS

The Ka band has been allocated to satellite service for some time. LMDS proponents have requested a co-primary license, implying by this type of request, that LMDS can coexist compatibly in the Ka band with communications satellites. LMDS proponents should "bear the burden" to show compatibility if they are to co-share. This has not been done for the simple reason that the two uses are basically incompatible. Both LMDS systems and communications satellite Very Small Aperture Terminals (VSAT) must operate in urban areas to be economically viable. The consequent interference due to near line-of-sight geometries between VSAT transmitters and a fraction of the thousands of fixed and mobile LMDS receivers located in the same area will be impossible to avoid.

A serious question can be raised regarding the prudence of allocating valuable spectrum for new video distribution methods when many other methods are already available. Because LMDS is technically viable only with small cells, 6-12 miles in diameter, it will only be profitable in high user-density urban areas. These areas are already well served by competing video distribution systems like cable, direct broadcast, satellite-based services, and emerging new means like optical cable.

If more video distribution spectrum must be assigned, it should be done very sparingly. The LMDS choice of analog FM uses spectrum very inefficiently given today's technology. Undoubtedly the choice is driven by economic considerations - availability of an abundance of low-cost NTSC TV equipment. But such a view is very shortsighted. With the 1991 launch of the Hughes DBS satellite and the imminent establishment by the US of a digital High Definition Television (HDTV) standard, development of low-cost, digital television equipment will explode overnight. The world's television manufacturers (principally Japan, Korean, Taiwan) have been anxiously waiting for the US decision for years. If more video distribution must be given, better utility of the available spectrum is achieved by using emerging digital technologies which provide factors of four or more improvement over analog FM technology.

The LMDS concept is not proven. There is sound reason to expect that LMDS systems will have severe link problems due to building blockage and foliage. These have not been factored into the design and may inevitably limit application of LMDS in city "canyons" and wooded areas. Additional link losses will be too large to overcome by simply increasing transmitter power.

Introduction of a service in a new frequency band is normally preceded by extensive field tests. The point of the ACTS program is to provide just such field test data to allow confidence in using the Ka band frequencies for Fixed Satellite Services, broadcast, or mobile and personal services. Some analogous trials are necessary to evaluate and demonstrate the performance of the LMDS in the Ka bands. No such data has been made available.

Recommendation to the FCC

The proper resolution of these competing currents must eventually occur in the marketplace. In the opinion of this committee, the public interest will be best served by a delay in granting a change in the use of the Ka Band frequencies. A delay would allow the ACTS experiments to take place in an atmosphere of at least a potential applications future; allow some opportunity for commercial exploitation of the ACTS technologies (through filings for systems); and provide some time for the emerging trends in computer, digital video, and personal communications systems, all of which have high probability of impacting bandwidth needs for video distribution and for determining the future needs for satellite communications services in this band. Consequently, the AIAA Technical Committee on Communications Systems

recommends that a five-year delay is the most responsible and appropriate action on the petition for LMDS.

A Note on the AIAA Technical Committee on Communications Systems

The AIAA Technical Committee on Communications Systems is composed of about thirty representatives from government, major companies in the communications industry, federal contract research centers, and university laboratories. The members are primarily principal engineers or technical managers from research and development organizations.